

Applicant: P. J. McCann, et al.
U.S.S.N.: 09/965,393
RESPONSE TO OFFICE ACTION
Page 21 of 30

REMARKS

Applicants appreciate the Examiner's thorough examination of the subject application and request reconsideration of the subject application based on the foregoing amendments and the following remarks.

Claims 1-42 are pending in the subject application.

Claims 1-42 stand rejected under 35 U.S.C. §102(e).

Claims 1, 2 and 21 were amended to more particularly describe and distinctly claim the subject technology.

The amendments to the claims are supported by the originally filed disclosure.

35 U.S.C. §102 REJECTIONS

Claims 1-42 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,823,336 to Srinivasan et al. for the reasons provided on pages 2-31 of the above-referenced Office Action. Applicants respectfully traverse.

Because claims were amended in the foregoing amendment, the following discussion refers to the language of the amended claim(s), however, only those amended features specifically relied on in the following discussion shall be considered as being made to overcome the prior art reference. The following addresses the specific rejections provided in the above-referenced Office Action.

Applicant: P. J. McCann, et al.
U.S.S.N.: 09/965,393
RESPONSE TO OFFICE ACTION
Page 22 of 30

Claim 1

Applicants claim, claim 1, a method for writing file systems write data operations to a storage medium including storing a file systems write data operation in a first temporary data store, mirroring the file systems write data operation in a second temporary data store and deleting the mirrored file systems write data operation from the second temporary data store upon receiving a signal indicating that the file systems write data operation is successfully written from the first temporary data store to the storage medium.

As asserted in the above-referenced Office Action, the third step of the method of claim 1 is found at col.2, lines 18-21, col. 16, lines 21-28 and col.6, lines 23-50 of Srinivasan et al. Applicants respectfully submit that Srinivasan et al. does not disclose inherently or explicitly the third step of the method of claim 1.

As to the third step of claim 1, it is provided that the mirrored file systems write data operation is deleted from the second temporary data store upon receiving a signal indicating that the file systems write data operation is successfully written from the first temporary data store to the storage medium. Srinivasan et al. is concerned with restricting access a database so that the database is not read during an inconsistent state. Rather than use a conventional method of a local copy, a snapshot copy and a mirrored copy of the database, Srinivasan et al. proposes including a storage A 43 and a storage B 44 in the secondary data storage system 23. Toggle switches 45 and 46 interconnect the storage 43 and 44 with the dataset secondary storage 42. As write data passes from the primary data storage system 20, the switch 45 alternatively passes the

Applicant: P. J. McCann, et al.
U.S.S.N.: 09/965,393
RESPONSE TO OFFICE ACTION
Page 23 of 30

write data between storage A 43 and storage B 44. Whichever storage area is receiving the write data, the switch 46 is set so that the previous write data is read from the other one. The switches toggle to reverse the scenario upon all of the updates since the last transaction commit command having actually been written from the primary data storage system 20. As a result, changes to the dataset secondary storage 42 on the secondary data storage system 23 are effectively buffered so that the database stored therein is not read in an inconsistent state. Eventually, the switch 45 toggles through a cycle and previous write data is overwritten.

Srinivasan et al. do not talk about deleting write operations to the second storage medium when the write operations when the first storage medium is completed but rather write data sits in a respective storage area 43 or 44 for a period after successful writing until such write data is overwritten. Further, Srinivasan et al. requires the toggle switches and additional storage A and B in order to function.

In sum, Srinivasan et al. disclose and teach using alternating buffers 43 and 44. Srinivasan et al. nowhere describe mirroring a write data operation in a second temporary data store and then deleting this write data operation from the second temporary data store if a signal indicating that the write operation between the first temporary data store and the storage medium is successful to reduce usage of memory. Srinivasan et al. do not teach or suggest using the write data in the storage 43 and 44 to recover from a failure at the primary data storage system 20 as would be available in the method of claim 1. Thus, Applicants respectfully submit that for at

Applicant: P. J. McCann, et al.
U.S.S.N.: 09/965,393
RESPONSE TO OFFICE ACTION
Page 24 of 30

least this reason, claim 1 and each of the claim depending therefrom are allowable and withdrawal of the rejection is respectfully requested.

Claim 2

Applicants do, however, make the following additional observations regarding dependent claim 2. Srinivasan et al. provide a technique where system operations are potentially left incomplete although the structure of the disk remains in tact similarly to that as described in the subject application on page 3, lines 11-17. In contrast, claim 2 provides writing the mirrored file systems write data operation from the second temporary data store to the storage medium upon receiving of a signal indicating that the file systems write data operation is not successfully written from the first temporary data store. Thus, the claimed method can recover from the failure of one cluster node, wherein the recovery includes the capability of updating the data file in a storage medium to include data that was not completely written. For this additional reason, Applicants respectfully submit that claim 2 is allowable and withdrawal of the rejection is respectfully requested.

CLAIM 11

As noted above, Srinivasan et al. disclose and teach using alternating buffers 43 and 44 to prevent reading a database in an inconsistent state. Srinivasan et al. provide a technique where system operations are potentially left incomplete although the structure of the disk remains in tact. Srinivasan et al. do not teach or suggest using the write data in the storage 43 and 44 to recover from a failure at the primary data storage system 20.

Applicant: P. J. McCann, et al.
U.S.S.N.: 09/965,393
RESPONSE TO OFFICE ACTION
Page 25 of 30

In contrast, Claim 11 recites a method including the steps of storing a file systems write data operation in a first temporary data store, mirroring the file systems write data operation stored in a second temporary data store, determining if the file systems write data operation stored in the first temporary data store is successfully written to the storage medium, deleting the file systems write data operation from the second temporary data store when it is determined that the file systems write data operation was successfully written from the first temporary data store to the storage medium and writing the mirrored file systems write data operation from the second temporary data store to the storage medium when it is determined that the file systems write data operation was not successfully written from the first temporary data store to the storage medium.

As a result, memory is efficiently utilized during normal operation and recovery occurs upon write data operation error. Srinivasan et al. do not teach or suggest such steps of deleting during normal operation and writing upon errors. Accordingly, claim 11 and each of the claims depending therefrom distinguish over Srinivasan et al. and withdrawal of the rejection is respectfully requested.

Claim 16

As noted above, Srinivasan et al. disclose and teach using alternating buffers 43 and 44 to prevent reading a database in an inconsistent state but do not teach or suggest maintaining or using the write data in the storage 43 and 44 to recover from a failure at the primary data storage system 20.

Applicant: P. J. McCann, et al.
U.S.S.N.: 09/965,393
RESPONSE TO OFFICE ACTION
Page 26 of 30

In contrast, claim 16 recites a method for writing file systems write data operations to a storage medium being serviced by a plurality of servers, each server including a first temporary data store and a second temporary data store. The method includes, *inter alia*, the steps of mirroring the file systems write data operation in the second temporary data store of another of the plurality of servers, deleting the file systems write data operation from the second temporary data store of said another of the plurality of servers when it is determined that the file systems write data operation stored in the first temporary data store of said one of the plurality of servers was successfully written to the storage medium, and writing the mirrored file systems write data operation in the second temporary data store of said another of the plurality of servers to the storage medium when it is determined that the file systems write data operation was not successfully written to the storage medium from the first temporary data store of said one of the plurality of servers. Srinivasan et al. do not teach or suggest such steps of deleting during normal operation and writing upon errors. Accordingly, claim 16 and each of the claims depending therefrom distinguish over Srinivasan et al. and withdrawal of the rejection is respectfully requested.

Applicant: P. J. McCann, et al.
U.S.S.N.: 09/965,393
RESPONSE TO OFFICE ACTION
Page 27 of 30

Claim 21

As noted above, Srinivasan et al. disclose and teach using alternating buffers 43 and 44 to prevent reading a database in an inconsistent state but do not teach or suggest mirroring write operation data between servers and having the write operation to either delete the mirrored data or using it for recovery based upon success of carrying out the write operation.

In contrast, claim 21 recites a system for writing file systems write data operations and recovering mirrored data operations when there is a failure of a cluster server in a clustered server/ data storage system. The system includes a storage medium, a plurality of servers servicing the storage medium, each server including a temporary data store and a re-direct filter driver configured and arranged to transmit a copy of write data operations associated with the respective server and a signal indicative of successful and unsuccessful completion of the write data operations, and a communications link, the communications link being configured and arranged so as to communicatively interconnect the temporary data store of one of the plurality of servers to the re-direct filter driver of another of the plurality of servers and to communicatively interconnect the temporary data store of said another of the plurality of servers to the re-direct filter driver of said one of the plurality of servers so that mirroring of the write data operations to another of the plurality of servers and monitoring of a status of carrying out the write data operations occurs. As a result, based upon success of carrying out the write operation, mirrored write operation data can be either deleted or used for recovery. Srinivasan et al. do not teach or suggest such a structural configuration. Accordingly, claim 21 and each of the claims

Applicant: P. J. McCann, et al.
U.S.S.N.: 09/965,393
RESPONSE TO OFFICE ACTION
Page 28 of 30

depending therefrom distinguish over Srinivasan et al. and withdrawal of the rejection is respectfully requested.

Claim 31

As noted above, Srinivasan et al. disclose and teach using alternating buffers 43 and 44 to prevent reading a database in an inconsistent state but do not teach or suggest maintaining or using the write data in the storage 43 and 44 to recover from a failure at the primary data storage system 20.

In contrast, claim 31 recites a program for execution on a central processing unit of each server of a cluster of servers that service a storage medium, the cluster of servers for processing file systems write data operations to be written to the storage medium and wherein each server includes a first and a second temporary data store. The program includes, *inter alia*, instructions and criteria for mirroring the file systems write data operation being stored in the first temporary data store of said one of the servers of the cluster in the second temporary data store of another of the servers of the cluster, deleting the mirrored file systems write data operation from the second temporary data store of said another of the servers of the cluster in the case when the file systems write data operation is successfully written from the first temporary data store of said one of servers of the cluster to the storage medium, and writing the mirrored file systems write data operation from the second temporary data store of said another of the servers of the cluster to the storage medium in the case when the file systems write data operation is not successfully written from the first temporary data store of said one of the servers of the cluster. Srinivasan et al. do

Applicant: P. J. McCann, et al.
U.S.S.N.: 09/965,393
RESPONSE TO OFFICE ACTION
Page 29 of 30

not teach or suggest such steps of deleting during normal operation and writing upon errors.

Accordingly, claim 31 and each of the claims depending therefrom distinguish over Srinivasan et al. and withdrawal of the rejection is respectfully requested.

Claim 34

As noted above, Srinivasan et al. disclose and teach using alternating buffers 43 and 44 to prevent reading a database in an inconsistent state but do not teach or suggest using the write data in the storage 43 and 44 to recover from a failure at the primary data storage system 20.

In contrast, claim 34 recites a method for writing file systems write data operations to a storage medium being serviced by a plurality of servers. The method includes, *inter alia*, the steps of monitoring the operational status of the each server and writing the mirrored file systems write data operation from the second temporary data store of said another server to the storage medium in the case when said monitoring determines that one server is not operational. As a result, errors are avoided. Srinivasan et al. do not teach or suggest such steps of monitoring the operational status so that writing the write data can occur with one server is not operational.

Accordingly, claim 34 and each of the claims depending therefrom distinguish over Srinivasan et al. and withdrawal of the rejection is respectfully requested.

It is respectfully submitted that the subject application is in a condition for allowance. Early and favorable action is requested.

Applicants believe that additional fees are not required for consideration of the within Response. However, if for any reason a fee is required, a fee paid is inadequate or credit is owed

Applicant: P. J. McCann, et al.
U.S.S.N.: 09/965,393
RESPONSE TO OFFICE ACTION
Page 30 of 30

for any excess fee paid, the Commissioner is hereby authorized and requested to charge Deposit
Account No. **04-1105**.

Respectfully submitted,

Date: June 14, 2005

By:

George Chacras

George N. Chacras, Reg. No. 46,608
Edwards & Angell LLP
Attorney for Applicants
P.O. Box 55874
Boston, MA 02205
Tel: (401) 276-6653
Fax: (888) 325-1684
Email: gchacras@edwardsangell.com

Customer No. 21,874